Alaska Department of Fish and Game
Division of Wildlife Conservation
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Furbearer Management Technique Development

Howard N. Golden

Research Performance Report
1 July 2002–30 June 2003
Federal Aid in Wildlife Restoration
Grant W-33-1, Study 7.19

This is a progress report on continuing research. Information may be refined at a later date.

FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
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PROJECT TITLE: Furbearer Management Technique Development

PRINCIPAL INVESTIGATOR: Howard N. Golden

COOPERATORS: Mike Anthony, Biological Resource Division of USGS; Nikolina Guldager, Yukon-Charley National Park; Merav Ben-David, University of Wyoming; Mike Goldstein, Chugach National Forest; Aaron Poe, Chugach National Forest; John Morton, Kenai National Wildlife Refuge; Ian Martin, Kenai Fjords National Park.

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR.: W-33-1

PROJECT NR.: 7.19

WORK LOCATION: Nelchina Basin, Kenai Peninsula, Prince William Sound, Yukon-Charley Rivers Basin, and western Brooks Range.

STATE: Alaska

PERIOD:1 July 2002–30 June 2003

I. PROGRESS ON PROJECT OBJECTIVES

OBJECTIVE

The objective of this study is to develop and test techniques that may be useful for management of furbearer populations in Southcentral and other regions of Alaska.

This study encompasses 6 projects indicated below as job objectives. Each job objective has its own set of objectives. This is the second performance period of project 7.19.

JOB OBJECTIVES:

Job 1. Aerial Track Count Techniques

1. Determine the most effective camera settings, aircraft speed, and aircraft type for recording and enumerating furbearer tracks with the digital video system.
2. Determine the most efficient design for transect placement considering topography and aircraft type.
3. Estimate the accuracy of aerial counts versus ground counts.

4. Estimate the level of correction needed to account for sightability differences among vegetation cover classes.

Progress was made on objectives 1–4. Both aerial- and ground-based tests have been used to conduct comprehensive field tests of the digital video system and track-transect techniques. All flights were made using a National Park Service aircraft.

Job 2. Accuracy of Wolverine Density Estimation Techniques

Assess the accuracy and relative precision of wolverine density estimates derived from line-intercept and network sampling techniques.

Progress on this objective was focused on preparing manuscripts from work conducted on study 7.18. See Job 6 and section IV below. Field conditions were not favorable and funds were not available for testing the accuracy of the density estimation technique. Additional progress was made in developing a plan to estimate wolverine density on the Kenai Peninsula in coordination with managers of the Chugach National Forest, Kenai National Wildlife Refuge, and Kenai Fjords National Park.

Job 3. River Otter Habitat Selection and Population Monitoring

1. Determine if latrine site use and fecal deposition rates are precise indicators of river otter abundance in coastal areas of southcentral Alaska.
2. Determine which habitat features are most important in defining coastal river otter habitat.
3. Estimate sustainable harvest levels of river otter populations in coastal environments of southcentral Alaska.

For objectives 1 and 2, progress involved surveying river otter latrine sites by boat along the coastline of eastern Prince William Sound. Work in this area of PWS will broaden our understanding of river otter populations throughout the sound. Progress on objective 1 also involved preparation of a manuscript of river otter latrine site use.

Progress on objective 3 will follow completion of objectives 1 and 2.

Job 4. Lynx Population Monitoring and Modeling

1. Continue to modify and enhance the lynx management model used in the tracking harvest strategy in southcentral Alaska.
2. Continue to analyze reproductive and other biological data from lynx carcasses.

We purchased lynx carcasses from trappers (as with project 7.18) to measure lynx reproductive parameters for use in the lynx management model. These data were used to recommend changes in lynx trapping regulations.

Job 5. Miscellaneous Investigations

1. Collaborate in a project to determine the morphologic and genetic variation of wolverines in southcentral Alaska.

Progress to date involved the purchase of wolverine carcasses for DNA sampling and archiving the samples. DNA analysis is ongoing at Idaho State University.

2. Estimate prey selection patterns and prey switching in lynx during their 9 to 11-year cycle.

Progress has involved the collection and archiving of muscle tissue samples from lynx carcasses purchased from trappers

Job 6. Publications and Meetings

Prepare manuscripts for publication from studies 7.18 and 7.19.

As senior author or coauthor, I completed or continued to make progress on several manuscripts related to Projects 7.18 and 7.19. I also represented the Department at the National Furbearer Manager's Workshop on Best Management Practices for Trapping in Council Bluffs, Iowa, 29 April–2 May 2002. In addition, I presented papers on results of our wolverine research at the Carnivores 2002 Conference in Monterey, California in November 2002, the annual meeting of the Alaska chapter of The Wildlife Society in Juneau, Alaska in April 2003, and the Northern Furbearer Conference in Whitehorse, Yukon in May 2003.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1. Aerial Track Count Techniques:

We participated with the cooperators to conduct field tests of the digital video system and track-transect techniques. We used a National Park Service Cessna 185 aircraft with digital cameras mounted to the floor of the fuselage to record tracks along several long aerial transects. We also recorded tracks along 12 2-km ground transects that were also then flown with the camera system to compare counts. We made progress in the development of software to process the video images and conducted statistical tests to determine subsampling capabilities and the minimum sample sizes required to analyze track data from transects.

JOB 2. Accuracy of Wolverine Density Estimation Techniques:

Progress on this job involved the completion or preparation as senior author or coauthor of 4 manuscripts for publication on: (1) predation on wolverines by wolves, (2) rates and causes of wolverine mortality, and (3) spatial use patterns and habitat selection of wolverines (see section IV and Appendix A). Field conditions were not favorable and funding was not available for testing the accuracy of the density estimation technique. We also developed a collaborative interagency survey plan to estimate the density of wolverines on the Kenai Peninsula with Chugach National Forest, Kenai National Wildlife Refuge, and Kenai Fjords National Park (Appendix B). ADF&G will contribute technical expertise and personnel but Federal Aid funds will not be used on this project.

JOB 3. River Otter Habitat Selection and Population Monitoring:

I continued analysis of latrine site data and preparation as senior author of a manuscript of river otter latrine site use (see section IV).

JOB 4. Lynx Population Monitoring and Modeling:

I analyzed lynx, snowshoe hare, and harvest trend data as well as area biologist observations for use in the lynx management model, LynxTrak. In consultation with area biologists, I used the model results to recommend season changes for lynx harvest in southcentral Alaska.

Job 5. Miscellaneous Investigations:

We processed tissue samples from lynx carcasses purchased from trappers and prepared them in the lab for stable isotope analysis.

Job 6. Publications and Meetings:

As senior author or coauthor, I completed or made progress on 5 manuscripts related to current and previous work on Jobs 2 and 3 for (Grants W-23-3, W-24-4, W-24-5, W-27-1, W-27-3, and W-27-4). See section IV and Appendix A. I also participated in the National Furbearer Manager's Workshop on Best Management Practices for Trapping in Council Bluffs, Iowa, 29 April–2 May 2002.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

1. I supervised the Fish and Wildlife Technician (FWT) positions for the Region II Research Section assigned to the Anchorage office. These positions provided support to this project during the performance period. This duty, which I have conducted since March 1995, involves hiring, supervising, and coordinating the work of a FWT IV and FWT III. Both positions are 11-month permanent-seasonal (P-S). In addition, I am responsible for hiring and supervising other temporary technicians or interns to assist seasonally as needed. During this performance period, I wrote evaluations and handled all personnel issues for these positions.

2. At the request of the Furbearer Resources Technical Group of the International Association of Fish and Game Agencies, I coauthored a brochure intended as a guide to trappers to help them avoid catching lynx while trapping bobcats and other furbearers (Appendix C). The brochure was prepared, in response to new federal regulations, for the U.S. Fish and Wildlife Service to print and distribute to trappers in the states where restrictions on lynx trapping apply. During this performance period, I worked with reviewers and editors in revising and finalizing the manuscript. This brochure should be published in September 2003.

IV. PUBLICATIONS

Journal articles

White, K. S., H. N. Golden, K. J. Hundertmark, and G. R. Lee. 2002. Predation by wolves, *Canis lupus*, on wolverines, *Gulo gulo*, and an American marten, *Martes americana*, in Alaska. Canadian Field-Naturalist 116: 132–134. **Note: This publication was late in being printed.*

Krebs, J., E. Lafroth, J. Copeland, V. Banci, D. Cooley, H. Golden, A. Magoun, and R. Mulders. *In review*. Rates and causes of mortality in North American wolverine. Journal of Wildlife Management 000: 000–000.

Golden, H. N., and K. S. White. *In prep*. Wolverine (*Gulo gulo*) spatial use patterns and habitat selection in southcentral Alaska. Journal of Mammalogy 000: 000–000.

Golden, H. N., and M. Ben-David. *In prep*. Monitoring river otter latrines to index population trends: is it a reliable tool? Journal of Mammalogy 000: 000–000.

Brochure

Golden, H., and T. Krause. 2003. How to avoid incidental take of lynx while trapping or hunting bobcats and other furbearers. International Association of Fish and Wildlife Agencies and the U.S. Fish and Wildlife Service, Washington, D.C., USA.

V. RECOMMENDATIONS FOR THIS PROJECT

I recommend continuing with the objectives and jobs specified in the study plan for the next performance period.

VI. APPENDIX

A. Abstracts of journal articles for Jobs 2 and 3:

White, K. S., H. N. Golden, K. J. Hundertmark, and G. R. Lee. 2002. Predation by wolves, *Canis lupus*, on wolverines, *Gulo gulo*, and an American marten, *Martes americana*, in Alaska. Canadian Field-Naturalist 116: 132–134.

Abstract: We report three instances of wolf predation on mustelids in Alaska; two involved wolverines and another involved an American marten. Such observations are rare and in previous studies usually have been documented indirectly. This account provides insight into the potential role of wolves in influencing mesocarnivore communities in northern environments.

Krebs, J., E. Lafroth, J. Copeland, V. Banci, D. Cooley, H. Golden, A. Magoun, and R. Mulders. *In review*. Rates and causes of mortality in North American wolverine. Journal of Wildlife Management 000: 000–000.

Abstract: Understanding vital rates is fundamental to the evaluation of conservation options for wolverines (*Gulo gulo*). We estimated survival rates for wolverine in trapped and untrapped populations within montane, boreal, and tundra environments using data from 12 North American radiotelemetry studies carried out between 1972 and 2001. Survivorship rates were estimated for males and females, and adults and subadults using Kaplan-Meier staggered entry techniques. Rates were based on data for 62 mortalities of 239 radiotagged wolverine monitored over 207 wolverine-years. Mortalities included 22 trapped/hunted, 3 road/rail kill, 11 predation, 18 starvation, and 8 unknown. Survival was substantially lower in trapped (< 0.75 for all sex/age categories) than untrapped (>0.84 for all sex/age categories) populations. Human-caused mortalities should be considered additive to natural mortality in a management context. Logistic growth rate estimates

suggest that trapped populations are declining ($\lambda \cong 0.88$) in absence of dispersal from untrapped populations ($\lambda \cong 1.06$). We recommend a system of spatial harvest controls in northern continuous populations of wolverine and curtailment of harvest along with more conservative measures in southern metapopulations.

Golden, H. N., and K. S. White. *In prep*. Wolverine (*Gulo gulo*) spatial use patterns and habitat selection in southcentral Alaska. Journal of Mammalogy 000: 000–000.

Abstract: Wolverines are wide-ranging, medium-sized carnivores that occur at naturally low densities throughout their circumboreal distribution. As opportunistic scavengers, variability in socially mediated, sex-specific selection pressure may result in corresponding variation in wolverine foraging ecology and consequent differences in home range utilization and habitat selection. Further, because of recent conservation concern for wolverine populations in many parts of North America, detailed understanding of factors influencing the spatial ecology of wolverines is needed. We used field based GPS location data combined with GIS habitat and topographic coverages to test hypotheses regarding sex- and age-specific spatial use patterns and multi-scale habitat selection for a population of radiocollared wolverines in a 6000-km^2 study area located in southcentral Alaska. We estimated annual home ranges for 5 females and 5 males using 100% minimum convex polygon and 95% and 50 % fixed kernel analyses. Overall, we found that female wolverines used smaller home ranges (224–1337 km^2, n = 3) than males (930–1137 km^2, n = 4) and subadult wolverines tended to have spatial use requirements similar to other animals in their sex class (females: 342–358 km^2, n = 2; males: 913 km^2, n = 1). Preliminary compositional analysis of sex-specific habitat selection indicated that female wolverines used rock outcrop and alpine habitats more frequently than did male wolverines at intermediate spatial scales. We also investigated the influence of topographic features (elevation, slope, and aspect) on patterns of wolverine occurrence. Our results document sex-based variation in wolverine spatial ecology and, within the context of other studies, feature insights into wolverine habitat use and home range requirements that enhance our ability to conserve and manage wolverines in northern environments.

B. Interagency survey plan summary for Job 2:

Golden, H., M. Goldstein, J. Morton, A. Poe, J. Selinger, and R. Sinnott. 2003. Wolverine survey plan for upper Turnagain Arm and Kenai Mountains. Interagency Collaborative Project Study Plan, Alaska Department of Fish and Game, Chugach National Forest, Kenai National Wildlife Refuge, and Kenai Fjords National Park, Anchorage, Alaska.

Wolverines (*Gulo gulo*) function as scavengers and predators in the ecosystem of southcentral Alaska. They are generally not present at high densities anywhere within their range but are important as a furbearer for human use and as a potential indicator of ecosystem health. The Alaska Department of Fish and Game (ADF&G) is responsible for management of furbearer populations throughout southcentral Alaska. The U. S. Forest Service, U. S. Fish and Wildlife Service, and the National Park Service are responsible for subsistence harvest management on federal lands and for management of other human uses that could affect wildlife resources. Because wolverine population density and reproductive potential is low relative to other furbearers, it is important for management

agencies to closely monitor wolverine populations and those human activities that could adversely affect them. Wolverines seem to prefer foothills and mountainous areas, which usually are lightly developed by humans but are often favored areas for hunting, trapping, snow machining, and other outdoor activities. In the Upper Turnagain Arm and Kenai Mountains, wolverines can be harvested under hunting and trapping regulations. This area also is used heavily for recreational snow machining and skiing, which have both increased rapidly in popularity in recent years. In particular, operators who drop off skiers by helicopter, known as heli-skiing, have expanded their areas of use and increased their permit requests to include much of the skiable terrain within the Chugach National Forest. The potential effect of winter recreational activities on wolverine populations is unknown. To obtain baseline data on wolverine population density in the affected areas, ADF&G, CNF, and the Kenai National Wildlife Refuge, and Kenai Fjords National Park propose to conduct a density estimate using the sample unit probability estimation technique, which is based on wolverine track counts in winter. Beyond providing a statistically reliable estimate of wolverine density in the areas of concern, results of this survey effort will give an indication of wolverine distribution.

C. Introduction of lynx trapping brochure for Section III, Additional Work:

Golden, H., and T. Krause. 2003. How to avoid incidental take of lynx while trapping or hunting bobcats and other furbearers. International Association of Fish and Wildlife Agencies and the U.S. Fish and Wildlife Service, Washington, D.C., USA.

Canada lynx were listed by the U.S. Fish & Wildlife Service as threatened in the contiguous United States under the Endangered Species Act on March 24, 2000. As such, harvesting lynx is no longer permitted in any state except Alaska. In the contiguous United States, lynx may occur in Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, Wisconsin, and Wyoming. Harvest of bobcats and other furbearers, whether by trapping or hunting, is not affected by this ruling. However, trappers and hunters must use every reasonable effort to avoid taking lynx where they may occur in the contiguous 48 states. Lynx are very similar in appearance and habits to bobcats, and their range overlaps with them and other furbearer species. Therefore, it is important for trappers and hunters to know how to distinguish lynx from bobcats, to recognize their preferred habitat types, and to avoid capturing or harvesting lynx. Trappers must also learn what to do if a lynx is caught incidentally.

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $ 61,439 STATE SHARE $ 20,479 = TOTAL $ 81,918

VIII. PREPARED BY:

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